ExoPlanet News
An Electronic Newsletter

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Contents

1 Editorial

Welcome to Edition 184 of the ExoPlanet News!

As usual, we bring you abstracts of scientific papers, job ads, conference announcements, and an overview of exoplanet-related articles on astro-ph. Thanks a lot to all of you who contributed to this issue of the newsletter!

For the next month we look forward to your paper abstracts, job ads or meeting announcements. Also, special announcements are welcome. As always, we would also be happy to receive feedback concerning the newsletter. The LaTeX template (v2.0) for submitting contributions, as well as all previous editions of ExoPlanet News, can be found on the ExoPlanet News webpage (`https://nccr-planets.ch/exoplanetnews/`).

The next issue will appear on November 12th 2024.

Thanks again for your support, and best regards from the editorial team,

Leander Schlarmann
Daniel Angerhausen
Jeanne Davoult
Haiyang Wang
Timm-Emanuel Riesen

2 Abstracts of refereed papers

The CHEOPS view of the climate of WASP-3 b

G. Scandariato[1], L. Carone[2], P. E. Cubillos[2,3], P. F. L. Maxted[4], T. Zingales[5,6], M. N. Günther[7], A. Heitzmann[8], M. Lendl[8], T. G. Wilson[9], A. Bonfanti[2], G. Bruno[1], A. Krenn[2], E. Meier Valdes[10], V. Singh[1], M. I. Swayne[11,4], and the CHEOPS collaboration

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A&A, in press (arXiv:2409.16268)

Hot Jupiters are giant planets subject to intense stellar radiation. The physical and chemical properties of their atmosphere make them the most amenable targets for atmospheric characterization.
In this paper we analyze the photometry collected during the secondary eclipses of the hot Jupiter WASP-3 b by CHEOPS, TESS, and Spitzer. Our aim is to characterize the atmosphere of the planet by measuring the secondary eclipse depth in several passbands and constrain the planetary dayside spectrum.
We updated the radius and the ephemeris of WASP-3 b by analyzing the transit photometry collected by CHEOPS and TESS. We also analyzed the CHEOPS, TESS, and Spitzer photometry of the occultations of the planet, measuring the eclipse depth at different wavelengths.
Our update of the stellar and planetary properties is consistent with previous works. The analysis of the occultations returns an eclipse depth of 92$\pm$21 ppm in the CHEOPS passband, 83$\pm$27 ppm for TESS, and $>$2000 ppm in the IRAC 1-2-4 Spitzer passbands. Using the eclipse depths in the Spitzer bands, we propose a set of likely emission spectra that constrain the emission contribution in the CHEOPS and TESS passbands to approximately a few dozen parts per million. This allowed us to measure a geometric albedo of 0.21$\pm$0.07 in the CHEOPS passband, while the TESS data lead to a 95% upper limit of $\sim$0.2.
WASP-3 b belongs to the group of ultra-hot Jupiters that are characterized by a low Bond albedo ($<$0.3$\pm$0.1), as predicted by different atmospheric models. On the other hand, it seems to efficiently recirculate the absorbed stellar energy, which is not typical for similar, highly irradiated planets. To explain this inconsistency, we propose that other energy recirculation mechanisms are at play besides advection (for example, the dissociation and recombination of H_2). Another possibility is that the observations in different bandpasses probe different atmospheric layers; this would make the atmospheric analysis difficult without an appropriate modeling of the thermal emission spectrum of WASP-3 b, which is not feasible with the limited spectroscopic data available to date.

Download/Website: `https://arxiv.org/abs/2409.16268`

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Formation and evolution of a protoplanetary disk: combining observations, simulations and cosmochemical constraints

Alessandro Morbidelli[1,2], *Yves Marrocchi*[3], *Adnan Ali Ahmad*[4], *Asmita Bhandare*[5,6], *Sébastien Charnoz*[7], *Benoît Commerçon*[6], *Cornelis P. Dullemond*[8], *Tristan Guillot*[2], *Patrick Hennebelle*[4], *Yueh-Ning Lee*[9,10,11], *Francesco Lovascio*[6], *Raphael Marschall*[2], *Bernard Marty*[3], *Anaëlle Maury*[4,13,14], *and Okamoto Tamami*[12,2]

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Astronomy and Astrophysics, in press (arXiv:2409.06342)

Context: The formation and evolution of protoplanetary disks remains elusive. We have numerous astronomical observations of young stellar objects of different ages with their envelopes and/or disks; moreover in the last decade the numerical simulations of star and disk formation have made tremendous progress, with realistic equations of state for the gas and treating the interaction of matter and the magnetic field, using the full set on non-ideal magnetohydrodynamics equations. Yet, it is not fully clear how a disk forms: from inside out or outside in, where the material accreted onto the disk falls and comes from, the evolution of dust in the disks, the appearance of structures. These unknowns limit our understanding of how planetesimals and planets form and evolve.
Aims: We attempt to reconstruct the evolutionary history of the protosolar disk, guided by the large amount of cosmochemical constraints derived from the study of meteorites, while using astronomical observations and numerical simulations as a guide of which scenarios may be plausible.
Methods: Our approach is highly interdisciplinary. We do not present new observations or simulations, but combine in an original manner a large number of published results concerning young stellar objects observations, numerical simulations, and the chemical, isotopic and petrological nature of meteorites to reconstruct the history of the protoplanetary disk at the origin of our Solar system.
Results: We achieve a plausible and coherent view of the evolution of the protosolar disk that is consistent with the cosmochemical constraints and compatible with observations of other protoplanetary disks and sophisticated numerical simulations. The evidence that high-temperature condensates, i.e. the calcium-aluminum inclusions (CAIs) and the amoeboid olivine aggregates (AOAs), formed near the protosun before being transported to the outer disk can be explained by either an early phase of vigorous radial spreading of the disk, or fast transport of these condensates from the vicinity of the protosun towards large disk radii via the protostellar outflow. The assumption that the material accreted towards the end of the infall phase was isotopically distinct allows us to explain the observed dichotomy in nucleosynthetic isotopic anomalies of meteorites and leads to intriguing predictions on the isotopic composition of refractory elements in comets. When the infall of material waned, the disk started to evolve as an accretion disk. Initially, dust drifted inwards, shrinking the radius of the dust component to ~ 45 au, probably about 1/2 of the width of the gas component. Then structures must have emerged, producing a series of pressure maxima in the disk which trapped the dust on My timescales. This allowed planetesimals to form at radically distinct times without changing significantly of isotopic properties. There was no late accretion of material onto the disk via streamers. The disk disappeared in 5 My, as indicated by paleomagnetic data in meteorites.
Conclusions: The evolution of the protosolar disk seems to have been quite typical in terms of size, lifetime, and dust behavior, suggesting that the peculiarities of the Solar system with respect to extrasolar planetary system probably originate from the chaotic nature of planet formation and not at the level of the parental disk.

Download/Website: `http://arxiv.org/abs/2409.06342`
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ESPRESSO reveals blueshifted neutral iron emission lines on the dayside of WASP-76 b

A. R. Costa Silva[1,2,3], *O. D. S. Demangeon*[1,2], *N. C. Santos*[1,2], *D. Ehrenreich*[3,4], *C. Lovis*[3], *et al.*

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Astronomy & Astrophysics, published (2024A&A...689A...8C)

Context. Ultra hot Jupiters (gas giants with $T_{eq} > 2000\,K$) are intriguing exoplanets due to the extreme physics and chemistry present in their atmospheres. Their torrid daysides can be characterised using ground-based high-resolution emission spectroscopy.
Aims. We search for signatures of neutral and singly ionised iron (Fe I and Fe II, respectively) in the dayside of the ultra hot Jupiter WASP-76 b, as these species were detected via transmission spectroscopy in this exoplanet. Furthermore, we aim to confirm the existence of a thermal inversion layer, which has been reported in previous studies, and attempt to constrain its properties.
Methods. We observed WASP-76 b on four epochs with ESPRESSO at the VLT, at orbital phases shortly before and after the secondary transit, when the dayside is in view. We present the first analysis of high-resolution optical emission spectra for this exoplanet. We compare the data to synthetic templates created with `petitRADTRANS`, using cross-correlation function techniques.
Results. We detect a blueshifted (-4.7 ± 0.3 km/s) Fe I emission signature on the dayside of WASP-76 b at $6.0\,\sigma$. The signal is detected independently both before and after the eclipse, and it is blueshifted in both cases. The presence of iron emission features confirms the existence of a thermal inversion layer. Fe II was not detected, possibly because this species is located in the upper layers of the atmosphere, which are more optically thin. Thus the Fe II signature on the dayside of WASP-76 b is too weak to be detected with emission spectroscopy.
Conclusions. We propose that the blueshifted Fe I signature is created by material rising from the hot spot to the upper layers of the atmosphere, and discuss possible scenarios related to the position of the hotspot. This work unveils some of the dynamic processes ongoing on the dayside of the ultra-hot Jupiter WASP-76 b through the analysis of the Fe I signature from its atmosphere, and complements previous knowledge obtained from transmission studies. It also highlights the ability of ESPRESSO to probe the dayside of this class of exoplanets.

Download/Website: `https://www.aanda.org/10.1051/0004-6361/202449935`
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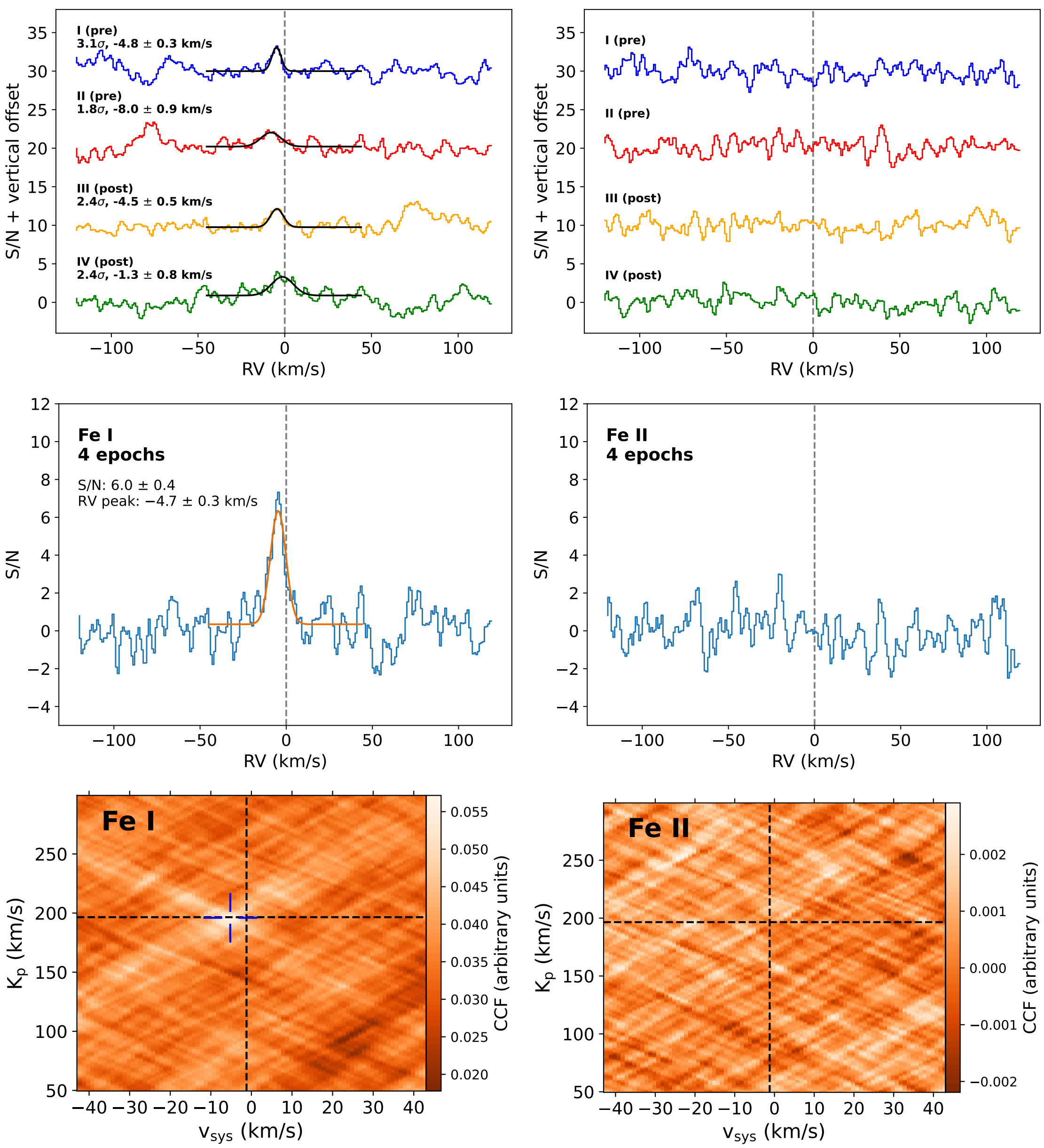

Figure 1: Results of the cross-correlation function (CCF) analysis for Fe I (*left*, detection) and Fe II (*right*, non-detection) on the dayside of WASP-76 b.
Top: Summed CCFs in the planet rest frame, for each of the four epochs observed, with 1D Gaussian fits (black lines). Fe I is tentatively detected at a 2−3σ level in each epoch and all epochs show a blueshifted signal. **Middle:** Summed CCFs of the four epochs in the planet rest frame, with no epoch separation. Fe I shows a 6.0σ detection, as traced by the 1D Gaussian fit (black line). **Bottom:** K_p - v_{sys} plot of the four epochs combined. The black dashed lines indicate the expected position of the signal. The location of the strongest signal is pinpointed by the blue dashes, for the case of Fe I.
(Fig. 4 of Costa Silva et al. 2024)

Influence of planets on debris discs in star clusters - II. The impact of stellar density

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Monthly Notices of the Royal Astronomical Society, published (2024MNRAS.533.4485W)

We present numerical simulations of planetary systems in star clusters with different initial stellar densities, to investigate the impact of the density on debris disc dynamics. We use LPS+ to combine N-body codes NBODY6++GPU and REBOUND for simulations. We simulate debris discs with and without a Jupiter-mass planet at 50 au, in star clusters with N=1k-64k stars. The spatial range of the remaining planetary systems decreases with increasing N. As cluster density increases, the planet's influence range first increases and then decreases. For debris particles escaping from planetary systems, the probability of their direct ejection from the star cluster decreases as their initial semimajor axis (a0) or the cluster density increases. The eccentricity and inclination of surviving particles increase as cluster density increases. The presence of a planet leads to lower eccentricities and inclinations of surviving particles. The radial density distribution of the remaining discs decays exponentially in sparse clusters. We derive a general expression of the gravitational encounter rate. Our results are unable to directly explain the scarcity of debris discs in star clusters. Nevertheless, given that many planetary systems have multiple planets, the mechanism of the planet-cluster combined gravitational influence on the disc remains appealing as a potential explanation.

Download/Website: `https://doi.org/10.1093/mnras/stae2067`

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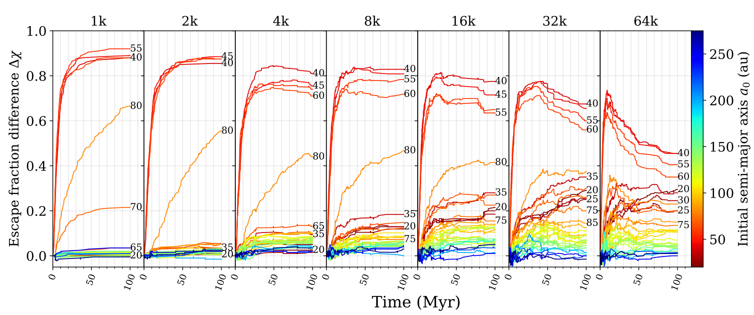

Figure 2: Difference of survivor fraction as a function of simulation time, for the ensemble of all planetary systems in the star cluster. Only test particles with $a_0 \leq 275$ au are included. Different colours indicate different initial semimajor axes. To distinguish curves with similar colours, we annotate values of several of the semimajor axes.

SWEET-Cat: A view on the planetary mass-radius relation

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Asronomy & Astrophysics, accepted, in press (arXiv:2409.11965)

SWEET-Cat (Stars With ExoplanETs Catalogue) was originally introduced in 2013, and since then, the number of confirmed exoplanets has increased significantly. A crucial step for a comprehensive understanding of these new worlds is the precise and homogeneous characterization of their host stars. We used a large number of high-resolution spectra to continue the addition of new stellar parameters for planet-host stars in SWEET-Cat following the new detection of exoplanets listed both at the Extrasolar Planets Encyclopedia and at the NASA exoplanet archive. We obtained high-resolution spectra for a significant number of these planet-host stars, either observed by our team or collected through public archives. For FGK stars, the spectroscopic stellar parameters were derived for the spectra following the same homogeneous process using ARES+MOOG as for the previous SWEET-Cat releases. The stellar properties are combined with the planet properties to study possible correlations that could shed more light into the star-planet connection studies. We increase the number of stars with homogeneous parameters by 232 ($\sim$ 25% - from 959 to 1191). We then focus on the exoplanets with both mass and radius determined to review the mass-radius relation where we find consistent results with the ones previously reported in the literature. For the massive planets we also revisit the radius anomaly where we confirm a metallicity correlation for the radius anomaly already hinted in previous results.

Download/Website: `https://arxiv.org/abs/2409.11965`

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Ncorpi$\mathcal{O}$N : A $\mathcal{O}(N)$ software for N-body integration in collisional and fragmenting systems.

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New Astronomy, Published (doi:10.1016/j.newast.2024.102313)

Ncorpi$\mathcal{O}$N is a general purpose N-body software initially developed for the time-efficient integration of collisional and fragmenting systems of planetesimals or moonlets orbiting a central mass. It features a fragmentation model, based on crater scaling and ejecta models, able to realistically simulate a violent impact.
The user of Ncorpi$\mathcal{O}$N can choose between four different built-in modules to compute self-gravity and detect collisions. One of these makes use of a mesh-based algorithm to treat mutual interactions in $\mathcal{O}(N)$ time. Another module, much more efficient than the standard Barnes-Hut tree code, is a $\mathcal{O}(N)$ tree-based algorithm called FalcON. It relies on fast multipole expansion for gravity computation and we adapted it to collision detection as well. Computational time is reduced by building the tree structure using a three-dimensional Hilbert curve. For the same precision in mutual gravity computation, Ncorpi$\mathcal{O}$N is found to be up to 25 times faster than the famous software REBOUND.
Ncorpi$\mathcal{O}$N is written entirely in the C language and only needs a C compiler to run. A python add-on, that requires only basic python libraries, produces animations of the simulations from the output files. Ncorpi$\mathcal{O}$N can communicate with REBOUND's webGL viewer via MPI for 3D visualization. The name Ncorpi$\mathcal{O}$N, reminding of a scorpion, comes from the French *N-corps*, meaning N-body, and from the mathematical notation $\mathcal{O}(N)$, due to the running time of the software being almost linear in the total number N of bodies. Ncorpi$\mathcal{O}$N detects collisions and computes mutual gravity faster than REBOUND, and unlike other N-body integrators, it can resolve a collision by fragmentation. The fast mutipole expansions are implemented up to order eight to allow for a high precision in mutual gravity computation.

Download/Website: `sciencedirect.com/science/article/pii/S1384107624001271?dgcid=author`

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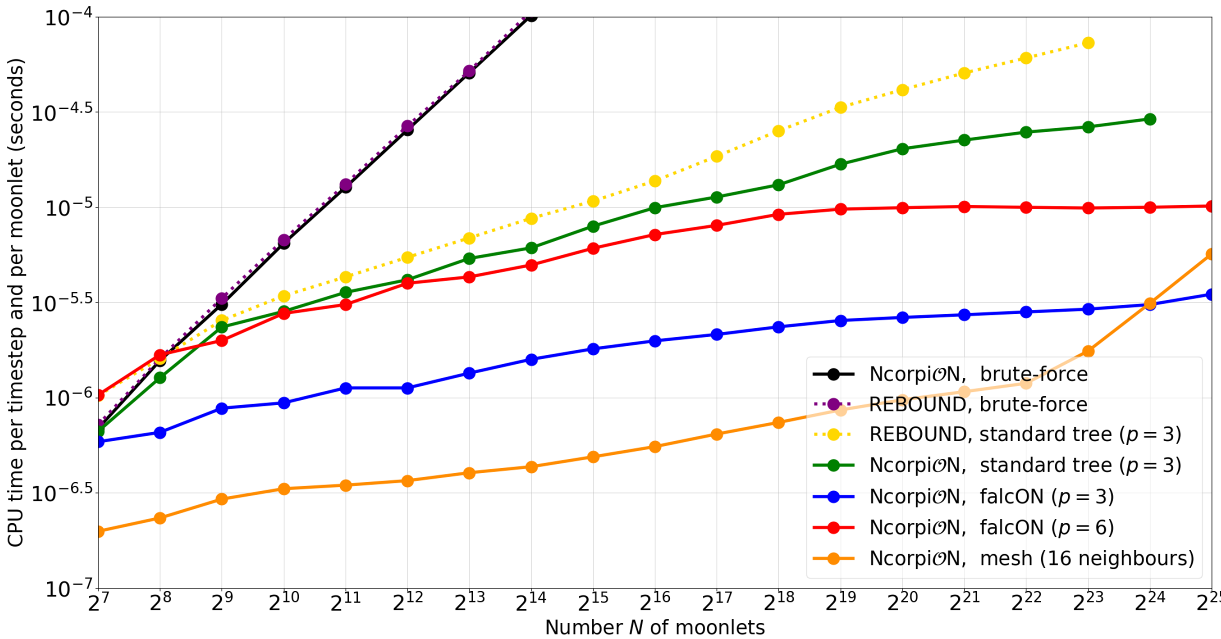

Figure 3: CPU time per timestep and per body with each of the four gravitational modules of Ncorpi$\mathcal{O}$N. The integer p is the expansion order of the Fast Multipole Method. A comparison with the famous software REBOUND is provided for reference. All speed tests were run with the same material, in the same conditions, and from the same initial conditions (only N was varying).

Spin and orbital dynamics of planets undergoing thermal atmospheric tides using a vectorial approach

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Astronomy & Astrophysics, published (2023A&A...679A.153V)

Earth-mass planets are expected to have atmospheres and experience thermal tides raised by the host star. These tides transfer energy to the planet that can counter the dissipation from bodily tides. Indeed, even a relatively thin atmosphere can drive the rotation of these planets away from the synchronous state. Here we revisit the dynamical evolution of planets undergoing thermal atmospheric tides. We use a novel approach based on a vectorial formalism, which is frame independent and valid for any configuration of the system, including any eccentricity and obliquity values. We provide the secular equations of motion after averaging over the mean anomaly and the argument of the pericenter, which are suitable to model the long-term spin and orbital evolution of the planet.

Download/Website: `https://arxiv.org/abs/2312.06672`

Contact: `acor@uc.pt`

3 Jobs and Positions

Call for Applications for the 2024 NASA Hubble Fellowship Program

Dr. Andrew Fruchter, Space Telescope Science Institute

Dr. Dawn M. Gelino, Jet Propulsion Laboratory

Dr. Paul Green, Smithsonian Astrophysical Observatory

Applications Due: 2024 October 30 at 7:00 PM EST (4:00 PM PST 24:00 UTC),

On behalf of the NASA Astrophysics Division, the Space Telescope Science Institute (STScI) announces the call for applications for postdoctoral fellowships under the NASA Hubble Fellowship Program (NHFP) beginning in Fall 2024. The NHFP supports postdoctoral scientists performing independent research that contributes to NASA Astrophysics (see https://science.nasa.gov/astrophysics/ for more information). The research may be theoretical, observational, and/or instrumental. If your application is successful and you accept our offer, you will become an NHFP Einstein, Hubble, or Sagan fellow depending on the area of your research. We are continuing the legacy of those three earlier programs in this way, and through joint management of the program by STScI in collaboration with the Chandra X-ray Center and the NASA Exoplanet Science Institute.

The NHFP is open to applicants of any nationality who have or will have completed all requirements for their doctoral degree on or after January 1, 2021 in astronomy, physics or related disciplines. The duration of the Fellowship is up to three years: an initial one-year appointment, and two annual renewals contingent on satisfactory performance and availability of NASA funds.

We anticipate offering up to 24 NHFP Fellowships this year. The Fellowships are tenable at a U.S. host institution of the fellow's choice, subject to a maximum of two new fellows per host institution per year, and no more than five fellows at any single host institution, except for short periods of overlap. Host institutions must have verified their compliance with the NHFP employment policy. The policy and a list of those hosts can be found at https://www.stsci.edu/stsci-research/fellowships/nasa-hubble-fellowship-program/nhfp-host-institution-employment-policy/host-institutions

The Announcement of Opportunity is available at the website: http://nhfp.stsci.edu. The application submission page will be open from September 5 until the application deadline on November 2, 2023. Applicants should follow the instructions given in the Announcement and also examine the Frequently Asked Questions. Please send any further inquiries about the NHFP to nhfp@stsci.edu.

Important Dates

- Wednesday, 30 October 2024, 7:00 PM EST (4:00 PM PST 24:00 UTC): Applications due
- Thursday, 06 November 2024: Letters of reference due (applications are due one week before the letters)

Offers will be made in early February 2025 and new appointments should begin on or about September 1, 2025. NHFP Fellowships are open to English-speaking citizens of all nations. All applicants will receive consideration without regard to race, creed, color, age, gender, gender identity or expression, sexual orientation or national origin. Women and members of minority groups are strongly encouraged to apply. Applicants should follow the instructions in the Announcement of Opportunity (http://nhfp.stsci.edu).

Download/Website: `http://nhfp.stsci.edu/`
Contact: `nhfp@stsci.edu`

2025 Trottier Postdoctoral Fellowship in Exoplanetary Science, Université de Montréal

Prof. René Doyon

Université de Montréal, Montréal, Canada, Starting date: May to September 2025

The Trottier Institute for Research on Exoplanets (IREx), affiliated with the Department of Physics of the Université de Montréal (UdeM), invites applications for the Trottier Postdoctoral Fellowship in experimental, observational or theoretical astrophysics applied to the study of exoplanets, which enables forefront independent research related to exoplanets. All areas of research related to exoplanets, related fields of astrophysics and astronomical instrumentation will be considered.

A PhD in physics, astronomy or related discipline is required at the time when the position starts. Preference will be given to applicants within 3 years of obtaining their PhD. Applicants with career interruptions due to parental, medical or family leaves, or other causes are invited to mention it in their cover letter if so desired. The position start date is between **May and September 2025**, and is for two years, renewable for a third year subject to performance and availability of funds.

Applicants should submit a cover letter (optional, max 1 page), a CV, a list of publications, and a statement of research interests (max 2 pages), and should arrange to have three referees send a letter of reference to **irex-applications@umontreal.ca by December 4, 2024, for full consideration**. This position will, however, remain open until filled.

IREx consists of a growing team of about 60 people working on a variety of observational, theoretical and instrumental projects related to the study of exoplanets and other related fields of astrophysics. They work within several research institutions located in Quebec, Canada (Université de Montréal, McGill University, Bishop's University, Montreal Planetarium of Space for Life, Université Laval). Our professors, researchers, and students are actively involved in large international projects related to the detection and characterisation of exoplanets, notably the James Webb Space Telescope, the SPIRou and NIRPS spectrographs, and have privileged access to time and data from these instruments.

IREx has also a vibrant science education and public outreach (EPO) program led by astrophysicists who are seasoned science communicators. We believe in the importance of training scientists who have exceptional scientific research skills, but also outstanding communication skills. All of our members are involved in bringing science to a wide audience in a variety of ways.

IREx advocates for diversity, inclusion and employment equity. We strongly encourage applications from women, visible and ethnic minorities, Indigenous people, persons with disabilities and people of all sexual orientations and gender identities to apply. With the support of our Equity, Diversity and Inclusion (EDI) Committee, we are committed to the professional integration of people from groups that are traditionally underrepresented in the physics research community.

More information on the position and on our institute and its members, our research programs, our EPO initiatives and our EDI efforts can be found on our website: https://exoplanetes.umontreal.ca/en.

Download/Website: `https://exoplanetes.umontreal.ca/en/emplois-formation/stages-postdoctoraux/`

Contact: `irex-applications@umontreal.ca`

4 Conferences and Workshops

Exoplanet Explorers (ExoExplorers) Seminar Series: Call for ExoGuides and ExoExplorers (Applications due October 18, 2024)

Marie Ygouf[1]*, on behalf of the ExoExplorers Organizing Committee*
[1] Jet Propulsion Laboratory

Pasadena, September 29, 2024

The Exoplanet Explorers ("ExoExplorers") Seminar Series is soliciting both US and International "ExoGuides" and "ExoExplorers" for our 5th cohort which will run January-June 2025! Both ExoGuide nominations and ExoExplorer applications are due Thursday, October 18th, 2024 at 6 PM Pacific.

Read on below for additional information and nomination/application details for each call:

1. Call for ExoGuide nominations

As an ExoGuide, we ask that you participate in a single, 2-hour meeting with the cohort (30-minute seminar and 90-min informal discussion) that speaks to your experiences as a scientist or engineer. The ExoExplorer organizers are eager to showcase broad, diverse perspectives and therefore encourage you to highlight any topic(s) you think may be of interest to the ExoExplorers.

ExoGuides should be faculty, staff, or equivalent career stage. We welcome both exoplanet and exoplanet-adjacent scientists and engineers (e.g., disks, stars, instrumentation) from any institution (US and international). **Nominations should be submitted `via this form` by 6p Pacific time on October 18th**. Self-nominations are welcome. The organizers will review nominations and reach out to potential ExoGuides in mid-November. **A complete nomination submitted by the deadline will be considered by the Organizing and Steering Committees for three (3) years (i.e., for this year's cohort, next year's cohort, and the year after that). You are welcome to reapply after those three years.**

A copy of this call can be found on the `ExoExplorers website`.

2. Call for ExoExplorer applications

The ExoExplorers program, sponsored by NASA's Exoplanet Exploration Program Office and the ExoPAG Executive Committee, will focus on the professional development of 10 PhD candidates and/or postdoc researchers ("ExoExplorers") at US and international institutions. Each member of the cohort will be featured in a webinar that will be live-streamed to the exoplanet community, helping to increase their visibility within the field. The cohort will also learn from the experiences of established exoplanet researchers and engineers in the field ("ExoGuides") via a combination of tailored presentations and small group discussions.

Members of this cohort, which will run from January 2024 to June 2025, will each give one 30-minute presentation on their research to the broader exoplanet community. Each of the ExoExplorers will receive $1,000 for the purchase of one presentation of their research results, presented as a part of the Science Series. In addition, the ExoExplorers will be invited to participate in:

1. Bi-weekly interactions between members of the cohort

2. Monthly informal group discussions with prominent scientists ("ExoGuides") in the fields of exoplanet science and engineering

3. One-on-one meetings with two to five researchers requested by the ExoExplorer, facilitated by the Organizing Committee

4. Two to four professional development events on topics to be decided by the cohort, such as proposal writing, establishing inclusive collaborations, career building, and public speaking

5. The development and/or execution of cohort-driven activities pertaining to diversity, equity, inclusion, and accessibility (DEIA) and/or exoplanet science and engineering

6. Mentorship opportunities with the organizers of the ExoExplorers program.

The activities described above will largely be shaped by the unique interests and needs of the cohort and amount to (on average) 1 hour / week of engagement throughout the 6 month cohort duration. Therefore, we solicit applicants who are actively seeking to enrich and enhance their exoplanet science and DEIA in the broader exoplanet community via engaging with each other, as well as with the ExoGuides and the ExoExplorer program organizers.

Candidates will be evaluated on the following three criteria:

1. A description of your research, addressing both its relevance to the broad themes in the ExEP Science Gap List (and related exoplanet topics), and the level of maturity of the science results you would plan to present in your seminar;

2. Cohort activities you wish to lead / engage in, and goals related to the activities described above, with specific examples;

3. How you would leverage your ExoExplorers experience to become leaders in exoplanet science and to increase DEIA in the broader exoplanet community.

The application will consist of the candidate's CV and a 700-1000 word essay that addresses the three criteria. A candidate's application will be evaluated based on how they address these three prompts. Competitive applicants would substantively address all of the above areas.

Further application instructions can be found on the ExoExplorer page, linked below.

Applications are due Thursday, October 18th, 2024 at 6 PM Pacific.

For more information about the ExoExplorers program, including a copy of this call and application instructions, please see `our website`. And if you have questions on either call, please see our `FAQ page`
– The ExoExplorer steering and organizing committees

Contact: `exoexplorers_questions@jpl.nasa.gov`

Rogue Worlds 2024: Uniting Theory and Observation

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Nakanoshima Center, Osaka, Japan, December 11–14, 2024

Rogue Worlds 2024 is the first international workshop dedicated to advancing the understanding of free-floating planets. With new probes of this population launching in the coming years, now is the time to bridge the gap between theoretical predictions and observational prospects. This workshop will bring together leading researchers from both theory and observation to foster collaboration and new insight on these exciting, little-understood worlds. Abstract submission closes on October 20th.

Download/Website: `https://rogueworlds2024.org`

Contact: `rogueworlds2024@gmail.com`

5 As seen on astro-ph

The following list contains exoplanet related entries appearing on astro-ph in September 2024.
Disclaimer: The hyperlinks to the astro-ph articles are provided for the convenience of the reader, but the ExoPlanet News cannot be responsible for their accuracy and perpetuity.

September 2024

astro-ph/2409.00067: **Projections of Earth's technosphere. I. Scenario modeling, worldbuilding, and overview of remotely detectable technosignatures** *by Jacob Haqq-Misra et al.*
astro-ph/2409.00249: **The dark days are overcast: Iron-bearing clouds on HD 209458 b and WASP-43 b can explain low dayside albedos** *by K. L. Chubb et al.*
astro-ph/2409.00167: **squishyplanet: Modeling Transits of Non-spherical Exoplanets in JAX** *by Ben Cassese et al.*
astro-ph/2409.00190: **Standing on the Shoulders of Giants: A Comprehensive Spectroscopic Survey of Transiting & High-Contrast Giant Planets** *by Munazza K. Alam et al.*
astro-ph/2409.00506: **Misaligned Disk and Stellar Oblateness Driven Sculpting of Exoplanetary Systems: Origin of Perpendicular Orbits in HD 3167** *by Tao Fu, Yue Wang*
astro-ph/2409.00675: **The GAPS Programme at TNG. LXI. Atmospheric parameters and elemental abundances of TESS young exoplanet host stars** *by S. Filomeno et al.*
astro-ph/2409.01401: **The time evolution of the ultraviolet habitable zone** *by R. Spinelli et al.*
astro-ph/2409.01239: **TOI-2379 b and TOI-2384 b: two super-Jupiter mass planets transiting low-mass host stars** *by Edward M. Bryant et al.*
astro-ph/2409.01371: **Searching for GEMS: TOI-5688 A b, a low-density giant orbiting a high-metallicity early M-dwarf** *by Varghese Reji et al.*
astro-ph/2409.01121: **Why heterogeneous cloud particles matter: Iron-bearing species and cloud particle morphology affects exoplanet transmission spectra** *by Sven Kiefer et al.*
astro-ph/2409.00996: **Influence of planets on debris discs in star clusters – II. The impact of stellar density** *by Kai Wu et al.*
astro-ph/2409.01173: **RedDots: Limits on habitable and undetected planets orbiting nearby stars GJ 832, GJ 674, and Ross 128** *by F. Liebing et al.*
astro-ph/2409.02157: **An Earth-Mass Planet and a Brown Dwarf in Orbit Around a White Dwarf** *by Keming Zhang et al.*
astro-ph/2409.02286: **The Wanderer: Charting WASP-77A b's Formation and Migration Using a System-Wide Inventory of Carbon and Oxygen Abundances** *by David R. Coria et al.*
astro-ph/2409.02223: **Orbital Architectures of Planet-Hosting Binaries III. Testing Mutual Inclinations of Stellar and Planetary Orbits in Triple-Star Systems** *by Elise L. Evans et al.*
astro-ph/2409.02196: **Gravitational instability in a planet-forming disk** *by Jessica Speedie et al.*
astro-ph/2409.02019: **ESCAPE project: investigating active observing strategies and post-processing methods for exoplanet high-contrast imaging with future space missions** *by Elodie Choquet et al.*
astro-ph/2409.01779: **The GAPS programme at TNG LX Atmospheric characterisation of KELT-9 b via single-line analysis: Detection of six H I Balmer lines, Na I, Ca I, Ca II, Fe I, Fe II, Mg I, Ti II, Sc II, and Cr II** *by M. C. D'Arpa et al.*
astro-ph/2409.01746: **Impact of vegetation albedo on the habitability of Earth-like exoplanets** *by Erica Bisesi et al.*
astro-ph/2409.03124: **Up, Up, and Away: Winds and Dynamical Structure as a Function of Altitude in the Ultra-Hot Jupiter WASP-76b** *by Aurora Y. Kesseli et al.*
astro-ph/2409.03002: **Disruption of exo-asteroids around white dwarfs and the release of dust particles in debris rings in co-orbital motion** *by Kyriaki I. Antoniadou, Dimitri Veras*
astro-ph/2409.02995: **The K2-24 planetary system revisited by CHEOPS** *by V. Nascimbeni et al.*

astro-ph/2409.02978: **Cavitating bubbles in condensing gas as a means of forming clumps, chondrites, and planetesimals** *by Eugene Chiang*

astro-ph/2409.02875: **RISTRETTO: reflected-light exoplanet spectroscopy at the diffraction limit of the VLT** *by Christophe Lovis et al.*

astro-ph/2409.02639: **Do anomalously-dense hot Jupiters orbit stealth binary stars?** *by Tanvi Goswamy et al.*

astro-ph/2409.03885: **Measuring the ^{34}S and ^{33}S isotopic ratios of volatile sulfur during planet formation** *by Alice S. Booth et al.*

astro-ph/2409.03852: **Searching for Additional Planets in TESS Multi-Planet Systems: Testing Empirical Models Based on Kepler Data** *by Emma V. Turtelboom et al.*

astro-ph/2409.03831: **Retrieval of Thermally-Resolved Water Vapor Distributions in Disks Observed with JWST-MIRI** *by Carlos E. Muñoz-Romero et al.*

astro-ph/2409.03812: **Biases in Exoplanet Transmission Spectra Introduced by Limb Darkening Parametrization** *by Louis-Philippe Coulombe et al.*

astro-ph/2409.03704: **TOI-3568 b: a super-Neptune in the sub-Jovian desert** *by E. Martioli et al.*

astro-ph/2409.03679: **Polar Neptunes are Stable to Tides** *by Emma Louden, Sarah Millholland*

astro-ph/2409.03466: **Panopticon: a novel deep learning model to detect single transit events with no prior data filtering in PLATO light curves** *by H. G. Vivien et al.*

astro-ph/2409.03446: **Light-curve analysis and shape models of NEAs 7335, 7822, 154244 and 159402** *by Javier Rodríguez Rodríguez et al.*

astro-ph/2409.03683: **Towards a self-consistent evaluation of gas dwarf scenarios for temperate sub-Neptunes** *by Frances E. Rigby et al.*

astro-ph/2409.04660: **Searching for Tidal Orbital Decay in Hot Jupiters** *by Efrain Alvarado III et al.*

astro-ph/2409.04557: **DeepTTV: Deep Learning Prediction of Hidden Exoplanet From Transit Timing Variations** *by Chen Chen et al.*

astro-ph/2409.04524: **A new atmospheric characterization of the sub-stellar companion HR 2562 B with JWST/MIRI observations** *by Nicolás Godoy et al.*

astro-ph/2409.04439: **Ab initio quantum dynamics as a scalable solution to the exoplanet opacity challenge: A case study of CO_2 in hydrogen atmosphere** *by Laurent Wiesenfeld et al.*

astro-ph/2409.03984: **A hybrid approach to generating diatomic line lists for high resolution studies of exoplanets and other hot astronomical objects: Updates to ExoMol MgO, TiO and VO line lists** *by Laura K. McKemmish et al.*

astro-ph/2409.04191: **Progress report on the BEBOP search for circumbinary planets with radial velocities** *by Thomas A. Baycroft et al.*

astro-ph/2409.04386: **Reliable Detections of Atmospheres on Rocky Exoplanets with Photometric JWST Phase Curves** *by Mark Hammond et al.*

astro-ph/2409.05220: **Seven decades of exploring planetary interiors with rotating convection experiments** *by Alban Pothérat, Susanne Horn*

astro-ph/2409.06092: **A Census of the beta Pic Moving Group and Other Nearby Associations with Gaia** *by K. L. Luhman*

astro-ph/2409.06031: **Thermal and magnetic evolution of an Earth-like planet with a basal magma ocean** *by Victor Lherm et al.*

astro-ph/2409.05987: **Simulated performance of energy-resolving detectors towards exoplanet imaging with the Habitable Worlds Observatory** *by Sarah Steiger et al.*

astro-ph/2409.05951: **The Role of Thermal Feedback in the Growth of Planetary Cores by Pebble Accretion in Dust Traps** *by Daniel P. Cummins, James E. Owen*

astro-ph/2409.05797: **Unveiling habitable planets: Toy coronagraph tackles the exozodiacal dust challenge** *by Yu-Chia Lin*

astro-ph/2409.05781: **ESCAPE project. CAPyBARA: a Roman Coronagraph simulator for post-processing methods development** *by Lisa Altinier et al.*

astro-ph/2409.05748: **Formation of Close-in Neptunes Around Low-Mass Stars Through Breaking Resonant Chains** *by Donald Liveoak, Sarah Millholland*

astro-ph/2409.05482: **Advancing Machine Learning for Stellar Activity and Exoplanet Period Rotation** *by Fatemeh Fazel Hesar et al.*

astro-ph/2409.06670: **Bulk and atmospheric metallicities as direct probes of sequentially varying accretion mechanisms of gas and solids onto planets** *by Yasuhiro Hasegawa, Mark R. Swain*

astro-ph/2409.06874: **The only inflated brown dwarf in an eclipsing white dwarf-brown dwarf binary: WD1032+011B** *by Jenni R. French et al.*

astro-ph/2409.06802: **A photochemical PHO network for hydrogen-dominated exoplanet atmospheres** *by Elspeth K. H. Lee et al.*

astro-ph/2409.06795: **The HD 191939 Exoplanet System is Well-Aligned and Flat** *by Jack Lubin et al.*

astro-ph/2409.06773: **Design, scientific goals, and performance of the SCExAO survey for planets around accelerating stars** *by Mona El Morsy et al.*

astro-ph/2409.06697: **Slow Rotation for the Super-Puff Planet Kepler-51d** *by Caleb Lammers, Joshua N. Winn*

astro-ph/2409.06637: **Magnetic Fields in a sample of planet-hosting M dwarf stars from Kepler, K2, and TESS observed by APOGEE** *by Fábio Wanderley et al.*

astro-ph/2409.06342: **Formation and evolution of a protoplanetary disk: combining observations, simulations and cosmochemical constraints** *by Alessandro Morbidelli et al.*

astro-ph/2409.06258: **Volatile-rich Sub-Neptunes as Hydrothermal Worlds: The Case of K2-18 b** *by Cindy N. Luu et al.*

astro-ph/2409.06158: **Y Dwarfs: The Challenge of Discovering the Coldest Substellar Population in the Solar Neighborhood** *by Sandy K. Leggett*

astro-ph/2409.07651: **Hot Jupiters are asynchronous rotators** *by Marek Wazny, Kristen Menou*

astro-ph/2409.07596: **How external photo-evaporation changes the chemical composition of the inner disc** *by Nelson Ndugu et al.*

astro-ph/2409.07552: **JWST COMPASS: The 3-5 Micron Transmission Spectrum of the Super-Earth L 98-59 c** *by Nicholas Scarsdale et al.*

astro-ph/2409.07542: **Nightside Clouds on Tidally-locked Terrestrial Planets Mimic Atmosphere-Free Scenarios** *by Diana Powell et al.*

astro-ph/2409.07520: **The inflated, eccentric warm Jupiter TOI-4914 b orbiting a metal-poor star, and the hot Jupiters TOI-2714 b and TOI-2981 b** *by G. Mantovan et al.*

astro-ph/2409.07289: **Detectability Simulations of a NIR Surface Biosignature on Proxima Centauri b with Future Space Observatories** *by Connor O. Metz et al.*

astro-ph/2409.07274: **Stellar energetic particle and cosmic ray effects in exoplanetary atmospheres** *by D. Rodgers-Lee*

astro-ph/2409.07229: **XUV irradiation of young planetary atmospheres. Results from a joint XMM-Newton and HST observation of HIP67522** *by A. Maggio et al.*

astro-ph/2409.07019: **The K2 and TESS Synergy III: search and rescue of the lost ephemeris for K2's first planet** *by Erica Thygesen et al.*

astro-ph/2409.06924: **The young exoplanetary system TOI-4562: Confirming the presence of a third body in the system** *by V. Fermiano et al.*

astro-ph/2409.08117: **JWST ice band profiles reveal mixed ice compositions in the HH 48 NE disk** *by Jennifer B. Bergner et al.*

astro-ph/2409.08067: **HD 222237 b: a long period super-Jupiter around a nearby star revealed by radial-velocity and Hipparcos-Gaia astrometry** *by Guang-Yao Xiao et al.*

astro-ph/2409.07876: **Impact sculpting of the early martian atmosphere** *by Oliver Shorttle et al.*

astro-ph/2409.07865: **Transit Timing Variation of K2-237b: Hints Toward Planet Disk Migration** *by Fan Yang et al.*

astro-ph/2409.08052: **RISTRETTO: a VLT XAO design to reach Proxima Cen b in the visible** *by N. Blind et* *al.*

astro-ph/2409.08254: **The Retrieved Atmospheric Properties of the Sub-stellar Object VHS 1256 b from Analyzing HST, VLT and JWST Spectra** *by Anna Lueber et al.*

astro-ph/2409.08313: **A Radio Technosignature Search of TRAPPIST-1 with the Allen Telescope Array** *by Nick Tusay et al.*

astro-ph/2409.08361: **Revisiting the Relationship Between Rocky Exoplanet and Stellar Compositions: Reduced Evidence for a Super-Mercury Population** *by Casey L. Brinkman et al.*

astro-ph/2409.08318: **Constraining atmospheric composition from the outflow: helium observations reveal the fundamental properties of two planets straddling the radius gap** *by Michael Zhang et al.*

astro-ph/2409.08373: **3D Radiation-Hydrodynamical Simulations of Shadows on Transition Disks** *by Shangjia Zhang, Zhaohuan Zhu*

astro-ph/2409.09127: **Knobs and dials of retrieving JWST transmission spectra. I. The importance of p-T profile complexity** *by Simon Schleich et al.*

astro-ph/2409.09666: **Classifications for Exoplanet and Exoplanetary Systems – Could it be developed? I. Exoplanet classification** *by E. Plávalová, A. Rosaev*

astro-ph/2409.10616: **The Juno Mission as a Probe of Long-Range New Physics** *by Praniti Singh et al.*

astro-ph/2409.10714: **Substantial extension of the lifetime of the terrestrial biosphere** *by R. J. Graham et al.*

astro-ph/2409.10679: **SPORES-HWO. II. Limits on Planetary Companions of Future High-contrast Imaging Targets from $>$20 Years of HIRES and HARPS Radial Velocities** *by Caleb K. Harada et al.*

astro-ph/2409.10517: **Mapping the exo-Neptunian landscape. A ridge between the desert and savanna** *by A. Castro-González et al.*

astro-ph/2409.11459: **Thermal Evolution of Lava Planets** *by Mahesh Herath et al.*

astro-ph/2409.11485: **Survey of Orion Disks with ALMA (SODA) III: Disks in wide binary systems in L1641 and L1647** *by Giulia Ricciardi et al.*

astro-ph/2409.11395: **Quartz Clouds in the Dayside Atmosphere of the Quintessential Hot Jupiter HD 189733 b** *by Julie Inglis et al.*

astro-ph/2409.11151: **The Impact of Icy Cometary 'Impacts' on Exoplanetary Atmospheres I: Tidally-Locked Terrestrial Exoplanets** *by Felix Sainsbury-Martinez et al.*

astro-ph/2409.11070: **Self-oxidation of the atmospheres of rocky planets with implications for the origin of life** *by Anders Johansen et al.*

astro-ph/2409.11005: **Evolution of gas envelopes and outgassed atmospheres of rocky planets formed via pebble accretion** *by Piia Maria Tomberg, Anders Johansen*

astro-ph/2409.12187: **Exoplanet accretion monitoring spectroscopic survey (ENTROPY) I. Evidence for magnetospheric accretion in the young isolated planetary-mass object 2MASS J11151597+1937266** *by Gayathri Viswanath et al.*

astro-ph/2409.12069: **Probing the Possible Causes of the Transit Timing Variation for TrES-2b in TESS Era** *by Shraddha Biswas et al.*

astro-ph/2409.12315: **The NEID Earth Twin Survey. I. Confirmation of a 31-day planet orbiting HD 86728** *by Arvind F. Gupta et al.*

astro-ph/2409.11965: **SWEET-Cat: A view on the planetary mass-radius relation** *by S. G. Sousa et al.*

astro-ph/2409.11620: **Updated forecast for TRAPPIST-1 times of transit for all seven exoplanets incorporating JWST data** *by Eric Agol et al.*

astro-ph/2409.12065: **Drifts of the sub-stellar points of the TRAPPIST-1 planets** *by Revol Alexandre et al.*

astro-ph/2409.13105: **Evolution of the Archean Atmosphere** *by Colin Goldblatt et al.*

astro-ph/2409.13062: **Exoplanet Demographics: Physical and Orbital Properties** *by Ryan Cloutier*

astro-ph/2409.13039: **Viewing the PLATO LOPS2 Field Through the Lenses of TESS** *by Yoshi Nike Emilia Eschen et al.*

astro-ph/2409.13021: **Running with the Bulls: The frequency of star-disc encounters in the Taurus star forming region** *by Andrew J. Winter et al.*

astro-ph/2409.12378: **Star cluster formation from turbulent clumps. IV. Protoplanetary disc evolution** *by Aayush Gautam et al.*

astro-ph/2409.12733: **Radiative Signatures of Circumplanetary Disks and Envelopes During the Late Stages of Giant Planet Formation** *by Aster G. Taylor, Fred C. Adams*

astro-ph/2409.13840: **Comparative Planetology of Magnetic Effects in Ultrahot Jupiters: Trends in High Resolution Spectroscopy** *by Hayley Beltz, Emily Rauscher*

astro-ph/2409.13651: **Planet Mass and Metallicity: The Exoplanets and Solar System Connection** *by Mark R. Swain et al.*

astro-ph/2409.13519: **ESPRESSO reveals blueshifted neutral iron emission lines on the dayside of WASP-76 b** *by A. R. Costa Silva et al.*

astro-ph/2409.13820: **Impacting Atmospheres: How Late-Stage Pollution Alters Exoplanet Composition** *by Emilia Vlahos et al.*

astro-ph/2409.13422: **Cleaning WASP-33 b transits from the host star photometric variability: analysis of TESS data from two sectors** *by Roman V. Baluev, Eugene N. Sokov*

astro-ph/2409.13294: **White Dwarf Systems: the Composition of Exoplanets** *by Amy Bonsor*

astro-ph/2409.14239: **A High-Resolution Spectroscopic Survey of Directly Imaged Companion Hosts: I. Determination of diagnostic stellar abundances for planet formation and composition** *by Aneesh Baburaj et al.*

astro-ph/2409.14477: **Self-sustaining living habitats in extraterrestrial environments** *by R. Wordsworth, C. Cockell*

astro-ph/2409.15407: **Gaussian Process Models Impact the Inferred Properties of Giant Planets around Active Stars** *by Quang H. Tran, Brendan P. Bowler*

astro-ph/2409.15507: **Radio Signatures of Star-Planet Interactions, Exoplanets, and Space Weather** *by J. R. Callingham et al.*

astro-ph/2409.15162: **Dynamics of Two Planets near a 2:1 Resonance: Case Studies of Known and Synthetic Exosystems on a Grid of Initial Configurations** *by Valeri Makarov et al.*

astro-ph/2409.14932: **The linear-mixing approximation in silica-water mixtures at planetary conditions** *by Valiantsin Darafeyeu et al.*

astro-ph/2409.17178: **MODEL&CO: Exoplanet detection in angular differential imaging by learning across multiple observations** *by Théo Bodrito et al.*

astro-ph/2409.14717: **Partial disruption of a planet around a white dwarf: the effect of perturbation from the remnant planet on the accretion** *by Abdusattar Kurban et al.*

astro-ph/2409.15247: **Population of excited levels of Fe+, Ni+ and Cr+ in exocomets gaseous tails** *by T. Vrignaud, A. Lecavelier des Etangs*

astro-ph/2409.16466: **A PyTorch Benchmark for High-Contrast Imaging Post Processing** *by Chia-Lin Ko et al.*

astro-ph/2409.16374: **Tidally Heated Sub-Neptunes, Refined Planetary Compositions, and Confirmation of a Third Planet in the TOI-1266 System** *by Michael Greklek-McKeon et al.*

astro-ph/2409.16354: **Forming planetary systems that contain only minor planets** *by Dimitri Veras, Shigeru Ida*

astro-ph/2409.16355: **The Featherweight Giant: Unraveling the Atmosphere of a 17 Myr Planet with JWST** *by Pa Chia Thao et al.*

astro-ph/2409.16270: **Extreme Weather Variability on Hot Rocky Exoplanet 55 Cancri e Explained by Magma Temperature-Cloud Feedback** *by Kaitlyn Loftus et al.*

astro-ph/2409.16268: **The CHEOPS view on the climate of WASP-3 b** *by G. Scandariato et al.*

astro-ph/2409.16255: **Water in protoplanetary disks with JWST-MIRI: spectral excitation atlas, diagnostic diagrams for temperature and column density, and detection of disk-rotation line broadening** *by Andrea Banzatti et al.*

astro-ph/2409.16046: **PEWDD: A database of white dwarfs enriched by exo-planetary material** *by Jamie Williams et al.*

astro-ph/2409.15951: **Secrets in the shadow: High precision stellar abundances of fast-rotating A-type exo-**

planet host stars through transit spectroscopy *by M. B. Lam et al.*

astro-ph/2409.16245: **Material Transport in Protoplanetary Discs with Massive Embedded Planets** *by Hannah J. Petrovic et al.*

astro-ph/2409.17394: **Most Super-Earths Have Less Than 3% Water** *by James G. Rogers et al.*

astro-ph/2409.17228: **Disk2Planet: A Robust and Automated Machine Learning Tool for Parameter Inference in Disk-Planet Systems** *by Shunyuan Mao et al.*

astro-ph/2409.17220: **Spatially correlated stellar accretion in the Lupus star forming region: Evidence for ongoing infall from the interstellar medium?** *by Andrew J. Winter et al.*

astro-ph/2409.17101: **Effects of the internal temperature on vertical mixing and on cloud structures in Ultra Hot Jupiters** *by Pascal A. Noti, Elspeth K. H. Lee*

astro-ph/2409.16993: **Searching for substellar companion candidates with Gaia. II. A catalog of 9,698 planet candidate solar-type hosts** *by Flavien Kiefer et al.*

astro-ph/2409.16992: **Searching for substellar companion candidates with Gaia. I. Introducing the GaiaPMEX tool** *by Flavien Kiefer et al.*

astro-ph/2409.16889: **Searching for GEMS: TOI-6383Ab, a giant planet transiting an M3-dwarf star in a binary system** *by Lia Marta Bernabò et al.*

astro-ph/2409.16660: **The ESO SupJup Survey III: Confirmation of 13CO in YSES 1 b and Atmospheric Detection of YSES 1 c with CRIRES+** *by Yapeng Zhang et al.*

astro-ph/2409.17042: **JWST/NIRISS and HST: Exploring the improved ability to characterise exoplanet atmospheres in the JWST era** *by Chloe Fisher et al.*

astro-ph/2409.17532: **TOI-2458 b: A mini-Neptune consistent with in situ hot Jupiter formation** *by Ján Šubjak et al.*

astro-ph/2409.18129: **TOI-5005 b: A super-Neptune in the savanna near the ridge** *by A. Castro-González et al.*

astro-ph/2409.18171: **Planet Mass Function around M stars at 1-10 au: A Plethora of sub-Earth mass objects** *by Yayaati Chachan, Eve J. Lee*

astro-ph/2409.18181: **ExoLyn: a golden mean approach to multi-species cloud modelling in atmospheric retrieval** *by Helong Huang et al.*

astro-ph/2409.18217: **3D Modeling of Moist Convective Inhibition in Hydrogen-Dominated Atmospheres** *by Namrah Habib, Raymond T. Pierrehumbert*

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